Focus on **Impacts of Climate Change on Washington's Economy**

Overview of the report produced by the Washington Economic Steering Committee coordinated by the Climate Leadership Initiative, Institute for a Sustainable Environment, University of Oregon

In 2006, a team of scientists and economists reached three conclusions about the effects of climate change on Washington's economy:

1. Climate change impacts are visible today and the economic effects are becoming apparent.
2. The costs of climate change will grow as temperatures and sea levels rise.
3. Climate change will also provide economic opportunities.

Temperatures
Scientists expect the climate in Washington to warm 0.5ºF every ten years. This is three times faster than the average rate from the 1900s to 2000. Compared to the 1970-1999 warming average the temperatures will increase:

- 2º Fahrenheit by the 2020s
- 3º Fahrenheit by the 2040s

Precipitation
Climate models show no consistent change in total annual rainfall through 2040. Because of rising temperatures, winters will bring more rain and less snow in the mountains.

Visible impacts

- **Glaciers**: Mountain glaciers in the North Cascades have lost 18 to 32 percent of their total volume since 1983. Up to 75 percent of North Cascades glaciers may disappear this century due to the expected rise in temperatures.
- **Snow-pack**: The average mountain snow-pack in the North Cascades (critical to summer stream-flows) has declined at 73 percent of mountain sites studied. Spring runoff is occurring earlier each year.
- **Peak flows**: Stream flows are peaking earlier in the year in watersheds throughout the state. This includes the Columbia Basin.
- **Wildfires**: The number of large (more than 500 acres) wildfires has increased from an average of 6 per year in the 1970s to 21 per year in the first part of the 21st century.
- **Rising sea levels**: In Puget Sound, tectonic subsidence will combine with rising sea levels to create a 1 to 5 inch sea level rise each decade. Other areas will have a smaller impact.

Economic Impacts
The economic effects of climate change in Washington will grow as temperatures increase.

- ***Direct costs of fighting wildfires*** may cost more than **$75 million** per year by the 2020s. This is a 50 percent increase from current costs and does not take into account the costs of lost timber value.

- ***Water conservation*** costs to offset the decline in guaranteed water of Seattle's water supply, due to climate change impacts, could exceed $8 million per year by the 2020s and **$16 million** per year by the 2040s. Eastern Washington communities in Spokane and Yakima will face similar impacts.
- ***Public health costs*** will increase due to smoke related health problems like asthma from wildfires.
- ***Tourism and recreation losses*** related to forest closures and smoke intrusion from wildfires could increase in some locations. An increase in flooding will also affect this area of the state's economy.
- ***Hydropower revenues*** may be affected as water management changes in response to rising temperatures. University of Washington researchers suggest up to a 5% loss in the Columbia River hydrosystem, or **$166 million** per year.
- ***Consumers could face water price increases*** in some basins. Current water conservation efforts in Seattle cost about **$680,000** per million gallons, per day, saved.
- ***Dairy cows*** are affected by higher-than-optimal temperatures. Dairy revenues in two key counties could decline by as much as **$6 million** per year by the 2040s.
- ***More frequent droughts in Yakima*** may cause crop losses due to water shortages. While drought does not occur every year, the averaged losses may increase by **$66 million** for Yakima. Other agricultural areas statewide are likely to face similar effects.
- ***New sea level rise projections*** could trigger a costly re-design of shoreline infrastructure. A 2-foot rise in the sea level will flood 35,848 acres.
- The following are likely to increase as the climate warms up. ***Flooding*** due to more intense rainstorms. Impacts on pubic health due to ***heat and vector-related illness*** such as West Nile virus. Impacts on ***snow sports.*** Impacts on ***salmon*** and ***other fisheries.***
- ***Cumulative economic effects*** are usually larger than the sum of obvious individual sector effects, such as those listed above. This is because of interactions between industries and economic sectors that depend on each other. As one industry declines, another may follow.

Opportunities

The report finds economic opportunities for fuel savings associated with reducing greenhouse gas and for adaptive management of new markets created by global warming:

- Transportation: More efficient running vehicles and planes, less miles traveled using vehicles, switching modes of transportation.
- Biofuels: Used for electricity and transportation.
- Renewable power: The greatest opportunities are in wind, fuel cells and solar.
- Energy efficiency: Smart energy, solar hot water, appliance standards, etc.
- Carbon capture: Particularly in soil and forests.

By supporting the companies that create innovative ways to reduce greenhouse gas, the state can strengthen its economy. A stronger economy will give the state the flexibility to address the (largely unknown but likely) costs of adapting to the impacts from climate change. Supporting these industries and sectors will also build on Washington's long-term strength in exporting technology.

Caveat

The report bases the cost assessment on gradual warming. However, if temperature thresholds are crossed at the global level this could trigger abrupt changes in climate conditions. If this happens, the economic costs of such changes would be much higher.